

CLAIMS

What is claimed is:

1. A power holdup circuit for maintaining a voltage supplied by a power supply comprising:

a monitoring circuit, the monitoring circuit monitoring the power supply voltage to detect a power dropout condition;

a power switching circuit including:

an energy storage device, the energy storage device storing energy for maintaining the voltage supplied by the power supply;

a select circuit, the select circuit enabling the storage of energy in the energy storage device in a first mode of operation and enabling the release of energy stored in the energy storage device in a second mode of operation,

wherein the monitoring circuit generates a control signal for selecting the mode of operation of the select circuit in accordance with the energy supplied by the power supply, and wherein the monitoring circuit protects the power holdup circuit by selectively entering the first mode of operation in response to a power dropout condition.

2. The power holdup circuit of claim 1 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the power dropout condition exceeds a predetermined time period.

3. The power holdup circuit of claim 2 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the voltage drop during a power dropout condition exceeds a predetermined value.

4. The power holdup circuit of claim 1 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the voltage drop during a power dropout condition exceeds a predetermined value.

5. The power holdup circuit of claim 1 wherein the monitoring circuit further comprises:

a first circuit for comparing the power supply voltage relative to a reference voltage; and

a second circuit for comparing the power supply voltage to an average of the power supply voltage.

6. The power holdup circuit of claim 1 wherein the monitoring circuit selects the second mode of operation when the power supply voltage falls below the reference voltage and the power supply voltage falls below the average of the power supply voltage.

7. The power holdup circuit of claim 1 wherein the monitoring circuit further comprises a timer circuit, the timer circuit determining a duration of a power dropout, wherein the monitoring circuit selects the second mode of operation when the duration of the power dropout exceeds a predetermined time period.

8. The power holdup circuit of claim 1 wherein the power switching circuit further comprises a charge circuit for controlling the charging of the energy storage device.

9. The power holdup circuit of claim 8 further comprising a current limiting device in series with the energy storage device.

10. The power holdup circuit of claim 9 further comprising a switch in series with the current limiting device to enable charging during the first mode of operation.

11. The power holdup circuit of claim 8 wherein the charge circuit further comprises one of the group of a soft-start charger, a dedicated charger, and a main rectifier charger.

12. The power holdup circuit of claim 1 wherein the energy storage device comprises one of the group of a battery, an accumulator, a capacitor, and an electrochemical device.

13. The power holdup circuit of claim 1 wherein the select circuit includes one of the group of a thyristor, a silicon controlled rectifier, a FET, a MOSFET, an IGBT, and a bipolar transistor.

14. A power holdup circuit for maintaining an energy supplied by a power supply comprising:

a monitoring circuit, monitoring circuit monitoring the power supply voltage to detect a power dropout condition the monitoring circuit including:

a first circuit for comparing the power supply voltage relative to a reference voltage; and

a second circuit for comparing the power supply voltage to an average of the power supply voltage;

a power switching circuit including:

an energy storage device, the energy storage device storing energy for maintaining the voltage supplied by the power supply;

a select circuit, the select circuit enabling the storage of energy in the energy storage device in a first mode of operation and enabling the release of energy stored in the energy storage device in a second mode of operation,

wherein the monitoring circuit generates a control signal for selecting the mode of operation of the select circuit in accordance with the energy supplied by the power supply, and wherein the monitoring circuit protects the power holdup circuit by selectively entering the first mode of operation in response to a power dropout condition.

15. The power holdup circuit of claim 14 wherein the monitoring circuit selects the second mode of operation when the power supply voltage falls below the reference voltage and the power supply voltage falls below the average of the power supply voltage.

16. The power holdup circuit of claim 15 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the power dropout condition exceeds a predetermined time period.

17. The power holdup circuit of claim 16 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the voltage drop during a power dropout condition exceeds a predetermined value.

18. The power holdup circuit of claim 15 wherein the monitoring circuit selects the second mode of operation in response to a power dropout condition and selects the first mode of operation if the voltage drop during a power dropout condition exceeds a predetermined value.

19. The power holdup circuit of claim 14 wherein the monitoring circuit further comprises a timer circuit, the timer circuit determining a duration of a power dropout, wherein the monitoring circuit selects the second mode of operation when the duration of the power dropout exceeds a predetermined time period.

20. The power holdup circuit of claim 19 wherein the power switching circuit further comprises a charge circuit for controlling the charging of the energy storage device.

21. The power holdup circuit of claim 20 further comprising a current limiting device in series with the energy storage device.

22. The power holdup circuit of claim 21 further comprising a switch in series with the current limiting device to enable charging during the first mode of operation.

23. The power holdup circuit of claim 20 wherein the charge circuit further comprises one of the group of a soft-start charger, a dedicated charger, and a main rectifier charger.

24. The power holdup circuit of claim 14 wherein the energy storage device comprises one of the group of a battery, an accumulator, a capacitor, and an electrochemical device.

25. The power holdup circuit of claim 14 wherein the select circuit includes one of the group of a thyristor, a silicon controlled rectifier, a FET, a MOSFET, an IGBT, and a bipolar transistor.

26. A power holdup circuit comprising:

a monitoring circuit for monitoring a difference between a power supply voltage and a holdup energy storage element; and

a switch circuit, the switch circuit turning on to release energy from the energy storage element when the difference between the power supply voltage and energy storage element exceeds a predetermined threshold level.

27. The power holdup circuit according to claim 26 wherein the switch circuit comprises a diode and a transistor configured wherein the predetermined threshold level is defined by a voltage rating of the diode plus a turn-on voltage of the transistor, and the holdup circuit is activated when the difference between the power supply voltage and the holdup capacitor voltage exceeds the predetermined threshold voltage.

28. The power holdup circuit according to claim 27 wherein the diode comprises a zener diode and the transistor comprises a metal-oxide-silicon field-effect transistor.

29. The power holdup circuit according to claim 27 wherein the predetermined threshold voltage is below the voltage of the energy storage device when the energy storage device is fully charged.

30. The power holdup circuit according to claim 27 wherein the energy storage device is charged to a predetermined level.

31. The power holdup circuit according to claim 30 wherein the predetermined level is the peak voltage of the power supply.

32. The power holdup circuit according to claim 27 wherein the energy storage device charges through a body diode of the transistor.

33. The power holdup circuit according to claim 32 further comprising a precharge resistor to limit the peak current for charging the energy storage device.

34. The power holdup circuit according to claim 27 wherein the power supply provides an alternating current voltage.

35. The power holdup circuit according to claim 27 wherein the monitoring circuit and switch circuit provide a power factor of not less than about 0.9.